

# Supplementary information: The Warm Winter Paradox in the Pliocene High Latitudes

Julia C. Tindall<sup>1</sup>, Alan M. Haywood<sup>1</sup>, Ulrich Salzmann<sup>2</sup>, Aisling M. Dolan<sup>1</sup>, and Tamara Fletcher<sup>1</sup>

<sup>1</sup>School of Earth and Environment, University of Leeds, Leeds, LS2 9JT, UK

<sup>2</sup>Department of Geography, Northumbria University, Newcastle upon Tyne NE1 8ST, UK,

**Correspondence:** Julia Tindall (earjcti@leeds.ac.uk)

## Supplementary Tables

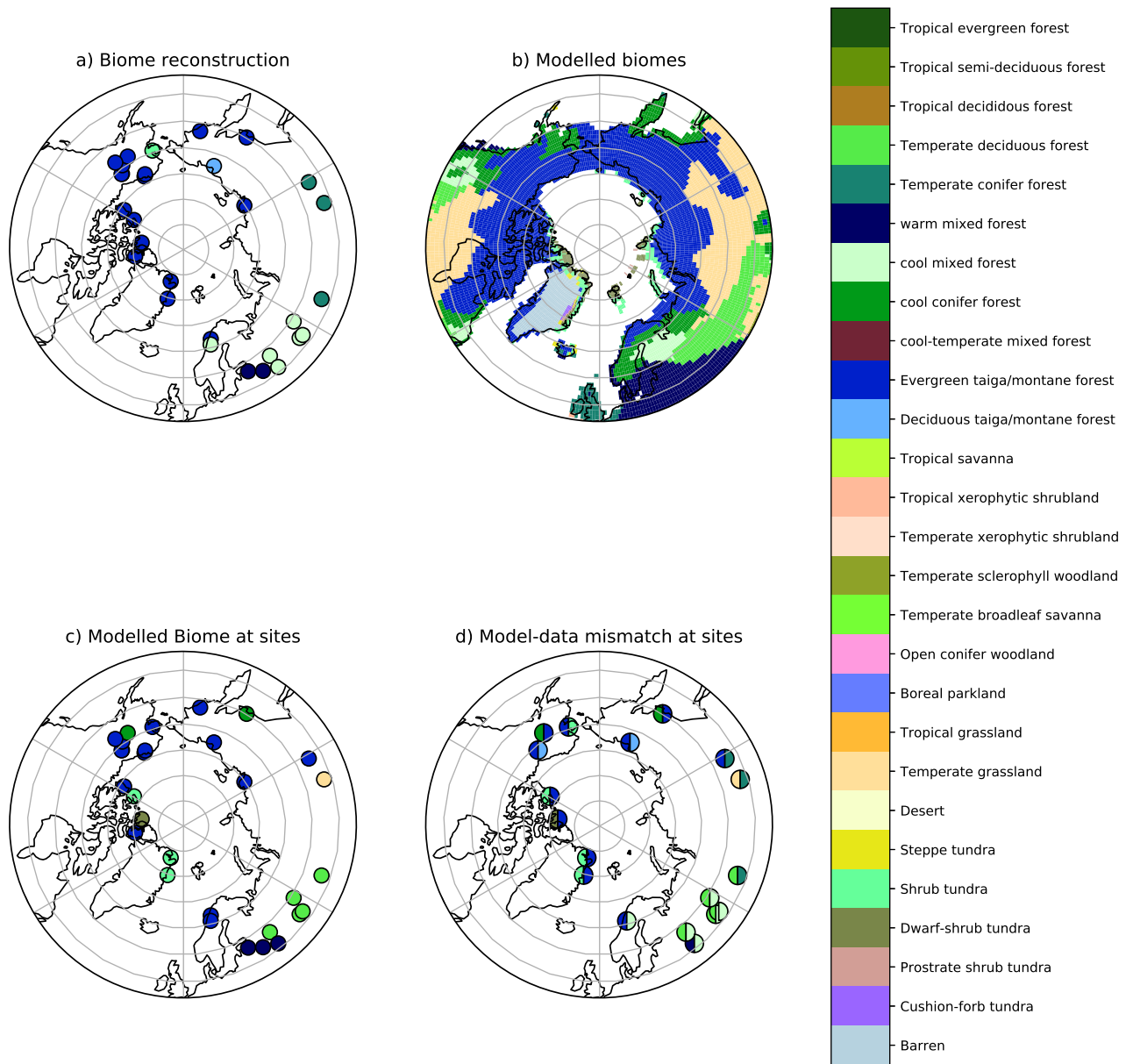
SITE	LOCATION	mPWP MAT		PI MAT		
		data	MMM	modern data	MMM	CRU*
Lost Chicken Mine	64N, 142 W	2.5	-2.8	-5.7	-7.6	-7.3
Lake Baikal	56N, 108E	7.0 +/- 4.0	-1.7	-3.6	-5.8	-6.3
James Bay Lowland	53N, 84W	6.0 +/- 4.5	2.9	-1.3	-1.6	-2.8
Pula Maar	47N 17E	12.8 +/- 1.2	13.0	9.9	9.2	9.9
Alpes-Maritimes	44N, 7E	17.5 +/-2.0	17.2	10.2	13.2	12.4
Tarragona	41N, 1E	20.0 +/- 3.5	18.8	15.7	15.3	n/a
Rio Maior	39N 9W	19.3 +/- 2.7	18.9	14.2	15.4	15.5
Yallalie	-30S 116E	21.0 +/- 5.0	21.2	18.8	18.8	17.4

**Table S1.** Data for initial DMC shown in figure 2. Note that CRU is from the years 1901-1930.

LOCATION	METHOD	mPWP Warm month (°C)		mPWP Cold month (°C)	
		data	model mean	data	model mean
Vegetation: figure 3					
Lake El'gygytgyn	BMA	15.0 - 16.0	16.2	-36.8 - -30.4	-24.0
Lake Baikal	CLE	15.3 - 17.5	22.9	-1.7 - 1.0	-24.2
Lake Baikal	CA	13.0 - 24.0	22.9	-15.0 - -5.0	-24.2
Mirny	CA	18.8 - 24.6	26.6	-0.3 - 0.7	-12.6
Merkutlinskiy	CA	17.3 - 23.8	25.7	-3.8 - 6.2	-12.7
Kabinet	CA	21.6 - 24.4	26.8	-4.4 - 4.6	-12.6
Delyankir	CA	18.9 - 24.9	21.1	-6.9 - 1.3	-32.0
Chernoluche	CA	19.6 - 20.3	26.5	-5.9 - 0.7	-11.8
Blizkiy	CA	15.6 - 23.3	16.3	-12.8 - 5.2	-23.2
42km	CA	21.6 - 23.3	26.8	-4.4 - 0.7	-12.6
Lost Chicken Mine	QE	12.0	15.9	< -2.0	-19.0
Tnekveem	CA	18.9 - 25.6	16.8	-11.8 - 5.8	-21.8
Hydzhak	CA	18.8 - 24.9	16.1	-8.7 - 1.3	-27.0
Meighen Island*	CLE	19.6 - 20.5 / 12.8 - 13.3	13.3	-11.6 - -11.4 / -6.8 - -6.2	-31.5
Beaver Pond*	CLE	18.4 - 20.9 / 12.4 - 13.1	13.2	-12.2 - -11.5 / -7.3 - -6.8	-30.5
Fyles Leaf Beds*	CLE	19.7 - 21.1 / 12.6 - 13.4	13.6	-12.8 - -9.1 / -7.2 - -5.5	-31.0
Meighen Island*	CA	18.1 - 22.8 / 10.6 - 16.2	13.3	-21.7 - -7.9 / -16.3 - -2.7	-31.5
Beaver Pond*	CA	18.1 - 22.4 / 11.3 - 16.3	13.2	-21.7 - -8.1 / -15.0 - -3.5	-30.5
Fyles Leaf Beds*	CA	18.1 - 22.7 / 10.9 - 15.0	13.6	-16.9 - -6.4 / -12.4 - -2.3	-31.0
Beetle: figure 4					
Meighen Island*	CLE	19.8 - 21.2 / 12.5 - 13.6	13.3	-15.0 - -11.6 / -9.4 - -6.3	-31.5
Beaver Pond*	CLE	13.6 - 13.9 / 7.4 - 7.7	13.2	-23.5 - -20.4 / -21.1 - -18.3	-30.5
Meighen Island*	CA	19.5 - 22.3 / 11.2 - 14.9	13.3	-24.0 - -13.0 / -15.7 - -6.1	-31.5
Beaver Pond*	CA	9.4 - 16.5 / 4.6 - 9.4	13.2	-25.0 - -10.4 / -25.0 - -4.1	-30.5
Ballast Brook	MCR	12.0 - 14.5	14.7	-21.9 - -19.5	-27.8
Strathcona Beaver Peat	MCR	11.7 - 12.2	13.2	-28.7 - -27.2	-30.5
Meighen Island	MCR	11.5 - 13.5	13.3	-33.0 - -18.5	-31.5
Lost Chicken Mine	MCR	13.5 - 16.0	15.9	-27.8 - -19.3	-19.1
Bluefish	MCR	12.7 - 15.0	16.9	-30.0 - -20.5	-22.0

**Table S2.** Values used in the seasonal temperature DMC shown in figure 3 and figure 4. \*Data presented for these sites was max/min temperature of the warmest/coldest month, and temperature of the warmest/coldest quarter. The WMMT and CMMT will lie within these values.

Supplementary figures



**Figure S1.** The same as figure 5 but with BIOME4 run in absolute mode. See section 2.